

CLAIMS

- 1 1. A file having at least one video track, the file
2 including a video stream descriptor list comprising:
3 a video stream header chunk;
4 a video stream format chunk following said video stream
5 header chunk; and
6 a video stream name chunk including a string indicating a
7 video stream in said at least one video track.
- 1 2. The file of claim 1, said video stream descriptor list
2 further comprising a video stream header data chunk in
3 response to said at least one video track being a digital
4 rights management (DRM) protected video, said video
5 stream header data chunk following said video stream
6 format chunk in said video stream descriptor list.
- 1 3. The file of claim 2, said video stream header data chunk
2 in said video stream descriptor list including a DRM
3 information data block comprising:
4 a first member specifying a version of the DRM; and
5 a second member specifying a protection of the DRM.
- 1 4. The file of claim 3, said DRM information data block in
2 said video stream header data chunk having a data
3 structure defined as:
4 typedef _DRMinfo {
5 WORD wVersion;
6 STR sDRMinfo;
7 } DRMINFO.

- 1 5. The file of claim 3, said second member of said DRM
2 information data block in said video stream header data
3 chunk including an encrypted binary string.
- 1 6. The file of claim 1, said video stream header chunk in
2 said video stream descriptor list including a four
3 character code "vids" specifying video stream data in
4 said at least one video track.
- 1 7. The file of claim 1, said video stream format chunk in
2 said video stream descriptor list including data having a
3 BITMAPINFOHEADER structure specifying a format of said at
4 least one video track.
- 1 8. The file of claim 7, said video stream format chunk in
2 said video stream descriptor list including palette
3 information of said at least one video track.
- 1 9. The file of claim 7, said BITMAPINFOHEADER structure
2 further specifying a version of the file.
- 1 10. The file of claim 1, said video stream name chunk in said
2 video stream descriptor list including a null terminated
3 text string "Video".
- 1 11. The file of claim 10, said null terminated text string
2 "Video" in said video stream name chunk further including
3 a description field describing said at least one video
4 track.

- 1 12. The file of claim 1, further including a video stream
2 data list comprising:
3 at least one data chunk identified by a two digit stream
4 index number followed by a two character code, said
5 two character code being "db" in response to said
6 least one data chunk being an uncompressed video
7 frame and being "dc" in response to said least one
8 data chunk being a compressed video frame; and
9 in response to said at least one data chunk being a
10 digital rights management (DRM) protected video
11 frame, a DRM data chunk identified by said two
12 digit stream index number followed by a two
13 character code "dd", said DRM data chunk preceding
14 said at least one data chunk and having DRM
15 protection information.
- 1 13. The file of claim 12, each of said at least one data
2 chunk in said video stream data list including data for
3 one video frame.
- 1 14. The file of claim 12, said at least one data chunk in
2 said video stream data list including an encoded data
3 chunk having a bidirectional frame and a following
4 predicting frame.
- 1 15. The file of claim 14, said at least one data chunk in
2 said video stream data list further including an uncoded
3 frame following said encoded data chunk.

- 1 16. The file of claim 1, further having at least one audio
2 track and including an audio stream descriptor list
3 comprising:
4 an audio stream header chunk;
5 an audio stream format chunk following said audio stream
6 header chunk; and
7 an audio stream name chunk including a string indicating
8 an audio stream in said at least one audio track.
- 1 17. The file of claim 16, said audio stream header chunk in
2 said audio stream descriptor list including a four
3 character code "auds" specifying audio stream data in
4 said at least one audio track.
- 1 18. The file of claim 16, said audio stream format chunk in
2 said audio stream descriptor list including data having a
3 WAVEFORMATEX structure specifying a format of said at
4 least one audio track.
- 1 19. The file of claim 16, said audio stream name chunk in
2 said audio stream descriptor list including a null
3 terminated text string "Audio".
- 1 20. The file of claim 19, said null terminated text string
2 "Audio" in said audio stream name chunk further including
3 a description field describing said at least one audio
4 track.

- 1 21. The file of claim 16, further including an audio stream
2 data list comprising at least one data chunk identified
3 by a two digit stream index number followed by a two
4 character code.
- 1 22. The file of claim 21, said two character code following
2 said two digit stream index number in said audio stream
3 data list being "wb".
- 1 23. The file of claim 21, each of said at least one data
2 chunk in said audio stream data list including data for
3 one audio frame in variable bit rate coding.
- 1 24. The file of claim 21, each of said at least one data
2 chunk in said audio stream data list including data for
3 at least one audio frame in constant bit rate coding.
- 1 25. The file of claim 21, wherein said at least one audio
2 track is interleaved with said at least one video track.
- 1 26. The file of claim 25, wherein said at least one audio
2 track is interleaved ahead of said at least one video
3 track by a time interval.

- 1 27. The file of claim 1, further having at least one chapter
2 track and including a chapter stream descriptor list
3 comprising:
4 a chapter stream header chunk;
5 a chapter stream format chunk following said chapter
6 stream header chunk; and
7 a chapter stream name chunk including a string indicating
8 a chapter stream in said at least one chapter
9 track.
- 1 28. The file of claim 27, said chapter stream header chunk in
2 said chapter stream descriptor list including a four
3 character code "txts" specifying text stream data in said
4 at least one chapter track.
- 1 29. The file of claim 27, said chapter stream format chunk in
2 said chapter stream descriptor list including data having
3 a TEXTINFO structure specifying a format of said at least
4 one chapter track, said TEXTINFO structure being:
5 typedef _textinfo {
6 WORD wCodePage;
7 WORD wCountryCode;
8 WORD wLanguageCode;
9 WORD wDialect
10 } TEXTINFO.
- 1 30. The file of claim 27, said chapter stream name chunk in
2 said chapter stream descriptor list including a null
3 terminated text string "Chapter".

- 1 31. The file of claim 30, said null terminated text string
2 "Chapter" in said chapter stream name chunk further
3 including a description field describing said at least
4 one chapter track.
- 1 32. The file of claim 27, further including a chapter stream
2 data list comprising a data chunk identified by a two
3 digit stream index number followed by a two character
4 code.
- 1 33. The file of claim 32, said two character code following
2 said two digit stream index number in said chapter stream
3 data list being "ch".
- 1 34. The file of claim 32, said data chunk in said chapter
2 stream data list having a structure defined as:
3 typedef struct _chapterchunk {
4 FOURCC fcc;
5 DWORD cb;
6 STR time;
7 STR description
8) CHAPTERCHUNK
9 wherein:
10 the fcc element specifies a four character code "nnxx";
11 the cb element specifies a size of said structure;
12 the time element specifies a starting time of said at
13 least one chapter track; and
14 the description element specifies a description of said
15 at least one chapter track.

- 1 35. The file of claim 34, the time element in said data chunk
2 in said chapter stream data list having a form
3 [hh:mm:ss.xxx], wherein:
4 hh represents hours;
5 mm represents minutes;
6 ss represents seconds; and
7 xxx represents milliseconds.
- 1 36. The file of claim 1, further having at least one subtitle
2 track and including a subtitle stream descriptor list
3 comprising:
4 a subtitle stream header chunk;
5 a subtitle stream format chunk following said subtitle
6 stream header chunk; and
7 a subtitle stream name chunk including a string
8 indicating a subtitle stream in said at least one
9 subtitle track.
- 1 37. The file of claim 36, wherein said at least one subtitle
2 track is interleaved with said at least one video track
3 in time.
- 1 38. The file of claim 44, wherein said at least one subtitle
2 track is interleaved ahead of said at least one video
3 track by a time interval.

1 39. The file of claim 36, said subtitle stream header chunk
2 in said subtitle stream descriptor list including a four
3 character code.

1 40. The file of claim 39, said four character code in said
2 subtitle stream header chunk being "txts" in response to
3 a text form subtitle.

1 41. The file of claim 40, said subtitle stream format chunk
2 in said chapter stream descriptor list including data
3 having a TEXTINFO structure specifying a format of said
4 at least one subtitle track, said TEXTINFO structure
5 being:

```
6 typedef _textinfo {  
7     WORD wCodePage;  
8     WORD wCountryCode;  
9     WORD wLanguageCode;  
10    WORD wDialect  
11 } TEXTINFO.
```

1 42. The file of claim 39, said four character code in said
2 subtitle stream header chunk being "vids" in response to
3 a bitmap form subtitle.

1 43. The file of claim 42, said subtitle stream format chunk
2 in said subtitle stream descriptor list including data
3 having a BITMAPINFOHEADER structure specifying a format
4 of said at least one subtitle track.

1 44. The file of claim 36, said subtitle stream name chunk in
2 said subtitle stream descriptor list including a null
3 terminated text string "Subtitle".

1 45. The file of claim 44, said null terminated text string
2 "Subtitle" in said subtitle stream name chunk further
3 including a description field describing said at least
4 one subtitle track.

1 46. The file of claim 36, further including a subtitle stream
2 data list comprising a data chunk identified by a two
3 digit stream index number followed by a two character
4 code.

1 47. The file of claim 46, said two character code following
2 said two digit stream index number in said subtitle
3 stream data list being "st" in response to a text form
4 subtitle.

1 48. The file of claim 46, said two character code following
2 said two digit stream index number in said subtitle
3 stream data list being "sb" in response to a bitmap form
4 subtitle.

1 49. The file of claim 46, said data chunk in said subtitle
2 stream data list having a structure defined as:
3 typedef struct _subtitlechunk {
4 FOURCC fcc;
5 DWORD cb;
6 STR duration;
7 STR subtitle
8) SUBTITLECHUNK
9 wherein:
10 the fcc element specifies a four character code "nnxx";
11 the cb element specifies a size of said structure;
12 the time element specifies a starting time and a ending
13 time of said at least one subtitle track; and
14 the subtitle element includes:
15 a bitmap image in response to a bitmap form
16 subtitle; and
17 a unicode text in response to a text form subtitle.

1 50. The file of claim 49, the duration element in said data
2 chunk in said subtitle stream data list having a form
3 [hh:mm:ss.xxx-HH:MM:SS.XXX], wherein:
4 hh and HH represent hours;
5 mm and MM represent minutes;
6 ss and SS represent seconds; and
7 xxx and XXX represent milliseconds.

1 51. A medium having a file stored thereon, said file
2 comprising:
3 at least one video stream, each including:
4 a video stream descriptor list comprising a video
5 stream header chunk, a video stream format
6 chunk, and a video stream name chunk; and
7 a video stream data list comprising a plurality of
8 data chunks, each data chunk identified by a
9 two digit stream index number followed by a
10 two character code, said two character code
11 being "db" in response to the data chunk
12 being an uncompressed video frame and being
13 "dc" in response to the data chunk being a
14 compressed video frame; and
15 at least one audio stream, each including:
16 an audio stream descriptor list comprising an audio
17 stream header chunk, an audio stream format
18 chunk, and an audio stream name chunk; and
19 an audio stream data list comprising a plurality of
20 data chunks, each data chunk identified by a
21 two digit stream index number followed by a
22 two character code "wb".

- 1 52. The medium of claim 51, said at least one audio stream in
2 being interleaved ahead of said at least one video stream
3 in said file by a time interval, said time interval
4 having an upper limit of approximately ten seconds.
- 1 53. The medium of claim 51, said video stream header chunk in
2 said video stream descriptor list including a four
3 character code "vids" specifying video stream data in
4 said at least one video stream.
- 1 54. The medium of claim 51, said video stream format chunk in
2 said video stream descriptor list including data having a
3 BITMAPINFOHEADER structure specifying a format of said at
4 least one video stream.
- 1 55. The medium of claim 54, said video stream format chunk
2 further including palette information of said at least
3 one video stream.
- 1 56. The medium of claim 51, said video stream name chunk in
2 said video stream descriptor list including a null
3 terminated text string "Video".
- 1 57. The medium of claim 56, said video stream name chunk
2 further including a description field describing said at
3 least one video stream.

1 58. The medium of claim 51, each of said plurality of data
2 chunks in said video stream data list including data for
3 one video frame.

1 59. The medium of claim 51, said video stream descriptor list
2 further comprising a video stream header data chunk in
3 response to said at least one video stream being digital
4 rights management (DRM) protected, said video stream
5 header data chunk including a DRM information data block
6 having a structure defined as:

```
7         typedef _DRMinfo {  
8             WORD wVersion;  
9             STR sDRMinfo;  
10        } DRMINFO
```

11 wherein:

12 said element wVersion specifies a version of the DRM; and
13 said element sDRMinfo specifies a protection of the DRM.

1 60. The medium of claim 59, said element sDRMinfo in said DRM
2 information data block including an encrypted binary
3 string.

1 61. The medium of claim 59, said video stream data list
2 further comprising a DRM data chunk identified by said
3 two digit stream index number followed by a two character
4 code "dd"; said DRM data chunk preceding said data chunk
5 and having DRM protection information.

- 1 62. The medium of claim 51, said audio stream header chunk in
2 said audio stream descriptor list including a four
3 character code "auds" specifying audio stream data in
4 said at least one audio stream.
- 1 63. The medium of claim 51, said audio stream format chunk in
2 said audio stream descriptor list including data having a
3 WAVEFORMATEX structure specifying a format of said at
4 least one audio stream.
- 1 64. The medium of claim 51, said audio stream name chunk in
2 said audio streamer descriptor list including a null
3 terminated text string "Audio".
- 1 65. The medium of claim 64, said null terminated text string
2 "Audio" in said audio stream name chunk further including
3 a description field describing said at least one audio
4 stream.
- 1 66. The medium of claim 51, each of said plurality of data
2 chunks in said audio stream data list including data for
3 one audio frame in variable bit rate coding.
- 1 67. The medium of claim 51, each of said plurality of data
2 chunks in said audio stream data list including data for
3 at least one audio frame in constant bit rate coding.

1 68. The medium of claim 51, said file further comprising at
2 least one chapter stream, each including:
3 a chapter stream descriptor list comprising a chapter
4 stream header chunk, a chapter stream format chunk,
5 and a chapter stream name chunk; and
6 a chapter stream data list comprising a plurality of data
7 chunks, each identified by a two digit stream index
8 number followed by a two character code "ch".

1 69. The medium of claim 68, said chapter stream header chunk
2 in said chapter stream descriptor list including a four
3 character code "txts" specifying a text stream data in
4 said at least one chapter stream.

1 70. The medium of claim 68, said chapter stream format chunk
2 in said chapter stream descriptor list including data
3 having a TEXTINFO structure specifying a format of said
4 at least one chapter stream, said TEXTINFO structure
5 being:

```
6 typedef _textinfo {  
7     WORD wCodePage;  
8     WORD wCountryCode;  
9     WORD wLanguageCode;  
10    WORD wDialect  
11 } TEXTINFO.
```


1 71. The medium of claim 68, said chapter stream name chunk in
2 said chapter stream descriptor list including a null
3 terminated text string "Chapter".

1 72. The medium of claim 71, said chapter stream name chunk
2 further including a description field describing said at
3 least one chapter stream.

1 73. The medium of claim 68, said plurality of data chunks in
2 said chapter stream data list having a structure defined
3 as:

```
4 typedef struct _chapterchunk {  
5     FOURCC fcc;  
6     DWORD cb;  
7     STR time;  
8     STR description  
9 } CHAPTERCHUNK
```

10 wherein:

11 said fcc element specifies a four character code "nnxx";
12 said cb element specifies a size of said structure;
13 said time element specifies a starting time of said at
14 least one chapter stream; and
15 said description element specifies a description of said
16 at least one chapter stream.

- 1 74. The medium claim 73, said time element having a form
2 [hh:mm:ss.xxx], wherein:
3 hh represents hours;
4 mm represents minutes;
5 ss represents seconds; and
6 xxx represents milliseconds.
- 1 75. The medium of claim 51, said file further comprising at
2 least one subtitle stream, each including:
3 a subtitle stream descriptor list comprising a subtitle
4 stream header chunk, a subtitle stream format
5 chunk, and a subtitle stream name chunk; and
6 a subtitle stream data list comprising a plurality of
7 data chunks, each identified by a two digit stream
8 index number followed by a two character code, said
9 two character code being "st" in response to a text
10 form subtitle and "sb" in response to a bitmap form
11 subtitle.
- 1 76. The medium of claim 75, said subtitle stream header chunk
2 in said subtitle stream descriptor list including a four
3 character code, said four character code being "txts" in
4 response to a text form subtitle and "vids" in response
5 to a bitmap form subtitle.

1 77. The medium claim 75, wherein:

2 in response to a bitmap form subtitle, said subtitle

3 stream format chunk in said subtitle stream

4 descriptor list includes data having a

5 BITMAPINFOHEADER structure specifying a format of

6 said at least one subtitle stream; and

7 in response to a text form subtitle, said subtitle stream

8 format chunk in said subtitle stream descriptor

9 list includes data having a TEXTINFO structure

10 specifying a format of said at least one subtitle

11 stream, said TEXTINFO structure being:

12 typedef _textinfo {

13 WORD wCodePage;

14 WORD wCountryCode;

15 WORD wLanguageCode;

16 WORD wDialect

17 } TEXTINFO.

1 78. The medium of claim 75, said subtitle stream name chunk

2 in said subtitle stream descriptor list including a null

3 terminated text string "Subtitle".

1 79. The medium of claim 78, said subtitle stream name chunk

2 further including a description field describing said at

3 least one subtitle stream.

1 80. The medium of claim 75, said plurality of data chunks in
2 said subtitle stream data list having a structure:
3 typedef struct _subtitlechunk {
4 FOURCC fcc;
5 DWORD cb;
6 STR duration;
7 STR subtitle
8) SUBTITLECHUNK
9 wherein:
10 said fcc element specifies a four character code "nnxx";
11 said cb element specifies a size of said structure;
12 said time element specifies a starting time and a ending
13 time of said at least one subtitle stream; and
14 said subtitle element includes:
15 a bitmap image in response to a bitmap form
16 subtitle; and
17 a unicode text in response to a text form subtitle.

1 81. An audio video interleave (AVI) file executable by a
2 processor, comprising:
3 a video stream, including:
4 a video stream descriptor list comprising a video
5 stream header chunk, a video stream format
6 chunk, a video stream header data chunk in
7 response to said video stream being digital
8 rights management (DRM) protected, and a
9 video stream name chunk; and
10 a video stream data list comprising a plurality of
11 video data chunks, each video data chunk
12 identified by a two digit stream index number
13 followed by a two character code, said two
14 character code being "db" in response to the
15 video data chunk being an uncompressed video
16 frame and being "dc" in response to the video
17 data chunk being a compressed video frame;
18 an audio stream interleaved ahead of said video stream,
19 including:
20 an audio stream descriptor list comprising an audio
21 stream header chunk, an audio stream format
22 chunk, and an audio stream name chunk; and
23 an audio stream data list comprising a plurality of
24 audio data chunks, each identified by a two
25 digit stream index number followed by a two
26 character code "wb"; and

27 a subtitle stream interleaved ahead of said video stream,
28 including:
29 a subtitle stream descriptor list comprising a
30 subtitle stream header chunk, a subtitle
31 stream format chunk, and a subtitle stream
32 name chunk; and
33 a subtitle stream data list comprising a plurality
34 of subtitle data chunks, each identified by a
35 two digit stream index number followed by a
36 two character code, said two character code
37 being "st" in response to a text form
38 subtitle and "sb" in response to a bitmap
39 form subtitle.

1 82. The AVI file of claim 81, wherein, in response to a video
2 data chunk in said video stream data list being DRM
3 protected, said video stream data list includes a DRM
4 data chunk preceding said video data chunk, said DRM data
5 chunk having DRM protection information and being
6 identified by a two digit stream index number followed by
7 a two character code "dd".

1 83. The AVI file of claim 81, wherein each of said plurality
2 of audio data chunks in said audio stream data list
3 includes data for one audio frame in variable bit rate
4 coding.

1 84. The AVI file of claim 81, wherein each of said plurality
2 of audio data chunks in said audio stream data list
3 includes data for at least one audio frame in constant
4 bit rate coding.

1 85. The AVI file claim 81, wherein:
2 said video stream header chunk includes a four character
3 code "vids" specifying video stream data in said
4 video stream;
5 said video stream format chunk includes data having a
6 BITMAPINFOHEADER structure specifying a format of
7 said video stream;
8 said video stream name chunk includes a null terminated
9 text string "Video";
10 said audio stream header chunk includes a four character
11 code "auds" specifying audio stream data in said
12 audio stream;
13 said audio stream format chunk includes data having a
14 WAVEFORMATEX structure specifying a format of said
15 audio stream;
16 said audio stream name chunk includes a null terminated
17 text string "Audio";
18 said subtitle stream header chunk includes a four
19 character code, said four character code being
20 "txts" in response to a text form subtitle and
21 "vids" in response to a bitmap form subtitle;
22 said subtitle stream format chunk includes, in response
23 to a bitmap form subtitle, data having a
24 BITMAPINFOHEADER structure and, in response to a
25 text form subtitle, data having a TEXTINFO
26 structure; and
27 said subtitle stream name chunk includes a null
28 terminated text string "Subtitle".

- 1 86. The AVI file of claim 85, wherein said video stream
2 format chunk further includes palette information of said
3 video stream.
- 1 87. The AVI file of claim 85, wherein:
2 said video stream name chunk in said video stream
3 descriptor list further includes a description
4 field describing said video stream;
5 said audio stream name chunk in said audio stream
6 descriptor list further includes a description
7 field describing said audio stream; and
8 said subtitle stream name chunk in said subtitle stream
9 descriptor list further includes a description
10 field describing said subtitle stream.
- 1 88. The AVI file of claim 81, wherein each of said plurality
2 of video data chunks in said video stream data list
3 includes data for one video frame.
- 1 89. The AVI file of claim 81, wherein said plurality of video
2 data chunk in said video stream data list include:
3 an encoded data chunk having a bidirectional frame and a
4 following predicting frame; and
5 an uncoded frame following said encoded data chunk.

1 90. The AVI file of claim 81, further comprising a chapter
2 stream, including:
3 a chapter stream descriptor list comprising:
4 a chapter stream header chunk having a four
5 character code "txts";
6 a chapter stream format chunk having a TEXTINFO
7 structure specifying a format of said chapter
8 stream; and
9 a chapter stream name chunk having a null
10 terminated text string "Chapter"; and
11 a chapter stream data list comprising a plurality of
12 chapter data chunks, each identified by a two digit
13 stream index number followed by a two character
14 code "ch", said plurality of chapter data chunks
15 having a structure:
16 typedef struct _chapterchunk {
17 FOURCC fcc;
18 DWORD cb;
19 STR time;
20 STR description
21) CHAPTERCHUNK
22 wherein:
23 said fcc element specifies a four character code;
24 said cb element specifies a size of said structure;
25 said time element specifies a starting time of said
26 at least one chapter stream; and
27 said description element specifies a description of
28 said at least one chapter stream.